



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/680,665	10/06/2000	Avner Dor	10559-346001 / P8300	9766

20985 7590 10/09/2003

FISH & RICHARDSON, PC
12390 EL CAMINO REAL
SAN DIEGO, CA 92130-2081

EXAMINER

DO, CHAT C

ART UNIT	PAPER NUMBER
----------	--------------

2124

DATE MAILED: 10/09/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

4

Office Action Summary

Application No.

09/680,665

Applicant(s)

DOR ET AL.

Examiner

Chat C. Do

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/6/00;12/8/00;4/13/01;12/16/02;2/7/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Oath/Declaration

1. Receipt is acknowledged a foreign application No. 132270 filed in Israel on 7/10/2000, but the applicant has not complied with the requirements, since the oath, declaration or application data sheet does not acknowledge whether there is a priority claimed of a foreign application. A new oath, declaration or application data sheet is required in the body of which the present application should be identified whether there is the priority claimed.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitations in claim 15 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because the abstract is written too short.

Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities:

In claim 1, the term "above" should be replaced with "in" in line 2.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Re claim 1, the limitations "the efficiency" in line 1, "the performance" in line 1, and "the output vector" in line 11 lack antecedence basis. For examination purposes, the examiner considers these limitations as "an efficiency", "a performance", and "an output vector" respectively. In addition, it is unclear what it means and its distribution to the claim by the limitation "a ratio between each omitted row and each selected row" in line 4. For examination purposes, the examiner disregards this limitation.

Re claim 2, the limitation “unifying the output vectors” in line 2 is indefinite. For examination purposes, the examiner considers the limitation “unifying the output vectors” as “summing the output vectors”.

Re claim 5, the limitation “the respective sub-vector” lacks an antecedence basis. For examination purposes, the examiner considers this limitation as “a respective sub-vector”.

Thus, claims 3-4 and 6-8 are also rejected for being dependent on the rejected base claims 2 and 1 respectively.

Re claim 9, the limitation “first and second inputs” is indefinite. For examination purposes, the examiner considers the limitation as “first and second input units”.

Thus, claims 10-15 are also rejected for being dependent on the rejected base claim 9.

Claim Rejections - 35 USC § 101

8. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

9. Claims 1-8 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-8 clearly recite a method for performing a linear transformation according to a mathematic algorithm. Claims 1-8 fail to limit the method to any particular structure other than a general computer with input, memory, processing devices, and manipulated steps. In order for such a claimed method, computer-related

Art Unit: 2124

process, or a claimed non-specified apparatus implementing the underlined process to be statutory, the claims must include either a step or means that results in a physical transformation outside the computer or a limitation to a practical application. However, it is clear from the claims that the claims merely recite step or non-specific means for data computation and manipulation in performing a mathematical function. The input is a vector of numbers and output is also a vector of numbers. The claims fail to recite any step or means that results in a physical transformation outside the computer, that includes a limitation to a practical application, or that requires a specific computer to implement the claimed process. Therefore, claims 1-8 are clearly directed to a non-statutory subject matter.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 9-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Bui (U.S. 5,528,528)

Re claim 9, Bui discloses in Figure 12 an apparatus comprising: first and second inputs which receive input data and predetermined data (1212 and 1242); transformation circuitry (every other parts in Figure 12) which acts on the input data and predetermined data (1242 and 1212); control and address generation circuitry (1240), connected to a first

memory (1242), which generates corresponding addresses for accessing cells of memory, and for controlling the selection between a data receiving mode, in which data is received via first input, and a data processing mode, in which the arrival of incoming data via first input is blocked; and counter circuitry (control logic) for controlling the timing of the operations the apparatus.

Re claim 10, Bui further discloses in Figure 12 the transformation circuitry multiplies (1210) each element of the input data by a corresponding element of the transformation data.

Re claim 11, Bui further discloses in Figure 12 the transformation circuitry comprises a memory (1230) which stores the result of the multiplication.

Re claim 12, Bui further discloses in Figure 12 the transformation circuitry comprises summation and accumulation circuitry (1210).

Re claim 13, Bui further discloses in Figure 12 comprising a multiplexer circuitry (228) which selects between the data receiving mode and the data processing mode.

Re claim 14, Bui further discloses in Figure 12 wherein the control and address generation circuitry comprises: a second memory (1204) which stores pre-programmed processing and control data and; a comparator circuitry (228) which switches between the data receiving mode and the data processing mode.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being obvious over Steven ("Linear Algebra with Application").

Re claim 1, Steven discloses in page 250-253 a method for enhancing the efficiency of the performance of a linear transformation represented by an $R \times N$ matrix of at least one n -dimensional input vector above the real or complex or a finite field (page 251 wherein the discrete signals are collected in Finite field) comprising: storing in memory a ratio between each omitted row and each selected row; normalizing each column of matrix (equations d_k and w_k in page 251 wherein the w_k for the first row of matrix is $1 = e^{-0 \cdot kx}$); generating a modified vector from groups of equal columns in the normalized matrix (F_4); generating a modified matrix ($F_4 P_4$); and obtaining the output vector (d_4 in page 253). Steven does not disclose a step of omitting zero columns of matrix and the corresponding scalar components of the input vector. However, Steven discloses in same book page 210 a step of omitting zero columns of matrix and the corresponding scalar components of the input vector. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a step of omitting the computation of zero columns of matrix as seen in example 3 page 210 into Steven's invention page 250-253 because it would enable to reduce the computation process and power consumption.

Re claim 2, Steven further discloses in pages 250-253 comprising splitting the transformation matrix into several sub-matrices and obtaining the output vector by

unifying the output vectors resulting from the products of each sub-matrix (the large matrix F_4P_4 is sub-divided into four blocks as seen in section "The Fast Fourier Transform" in pages 252-253).

Re claim 3, Steven further discloses in page 250-253 the modified matrix encompasses a subset of rows of transformation matrix (F_4P_4 encompasses all the subset of rows of F_4 in page 252).

Re claim 4, Steven further discloses in page 253 comprising splitting the input vector into several sub-vectors such that each sub-vector corresponds to a sub-matrix and wherein the output vector is obtained by adding the output vectors resulting from the products of each sub-matrix (four w input components are break-down into two set of two input components w_1 and w_2 as seen in d_4 equation in page 253).

Re claim 5, Steven further discloses in page 253 comprising splitting a modified matrix into several sub-matrix, wherein an output vector is obtained by adding the output vectors resulting from the products of each sub-matrix, by the respective sub-vector (d_4 is obtained by adding the result of q_1 and q_2 ; subtracting q_2 from q_1 in page 253).

Re claim 6, Steven does not disclose a step normalizing each column of matrix by multiplying the column by the inverse of a lead element. However, it is well known in the art the step of converting complex number "j" into unity "1", one must multiply "j" by its inverse "-j". Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention is made to add a step of converting a complex number into unity by multiplying it with its inverse because it would enable to reduce the hardware circuitry and computation complexity of normalizing the complex number.

Re claim 7, Steven further discloses in page 252 the output vector is a product of the matrix and the input vector ($d = F_{NZ} = F_N P_{NW}$).

Re claim 8, Steven further discloses in page 253 comprising identifying groups of equal columns in the normalized matrix and attaching a unique location to each identified group (final d equation).

Re claim 9, it is an apparatus claim of claim 1. Thus, claim 9 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 10, it is an apparatus claim of claim 7. Thus, claim 10 is also rejected under the same rationale in the rejection of rejected claim 7.

Re claim 11, it is an apparatus claim of claim 1. Thus, claim 11 is also rejected under the same rationale in the rejection of rejected claim 1.

Re claim 12, it is an apparatus claim of claim 7. Thus, claim 12 is also rejected under the same rationale in the rejection of rejected claim 7.

Allowable Subject Matter

14. Claim 15 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 2124

- a. U.S. Patent No. 4,055,756 to Jolivet et al. disclose an image coder-decoder using a matrix transform with weighted contribution of several points of the image to the formation of one point of the transform.
- b. U.S. Patent No. 6,327,602 to Kim discloses an inverse discrete cosine transformer in an MPEG decoder.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chat C. Do whose telephone number is (703) 305-5655. The examiner can normally be reached on M => F from 7:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaki Kakali can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Chat C. Do
Examiner
Art Unit 2124

September 17, 2003



CHUONG DINH NGO
PRIMARY EXAMINER